HIGH DATA RATE OPTICAL SOLITOION COMMUNICATION SYSTEMS

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Abstract

Optical solitons are attractive at very high bit rates as linear systems are impossible at such high bit rates due to dispersion effect. In a solitor propagation system no dispersion compensation fibers are used. The pulses propagate partly as a soliton between repeaters, and at the latter part as the power decreases the system exhibits linear properties. As the system exhibits quasi -soliton propagation effects the system cannot be evaluated by soliton equations. Such a system can only be evaluated using modeling.

As the optical soliton is of the envelope of light waves whose fundamental properties are described by the Nonlinear Schrc dinger Equation (NLSE), the NLSE can be used to present the soliton concept for application to communications. The NLSE is solved using one of the numerical modeling, split step Fourier method.

Therefore the solution of the NLSE is used to present the solitor concept for application to communications. In this research, Short laser pulses are used to make the soliton communication system. The simulated results of 40Gbps single channel transmission of standard fiber and LEAF fiber are compared.

The results of the 4CGbps single channel transmission of standard fiber indicate that the maximum distance the pulse could travel is about 500km with a repeater spacing of 50km and the results o f the 40Gbps single channel transmission of LEAF fiber indicate that the maximum distance the pulse could travel is about 1250km with a repeater spacing of 50km.